

IOT GATEWAY

With 3G / 4G / LTE Connectivity

FOR WIFI SENSORS




Wilow



Contents

| | |
|--|-----------|
| 1. TECHNICAL SUPPORT..... | 3 |
| 2. VISUAL SYMBOLS DEFINITION..... | 3 |
| 3. ACRONYMS AND ABBREVIATIONS..... | 4 |
| 4. QUICK PRODUCT DESCRIPTION | 5 |
| 4.1-UNBOX YOUR WILLOW IOT 4G GATEWAY | 5 |
| 4.2-ACCESSORIES DESCRIPTION | 5 |
| 5. INSTALLATION | 6 |
| 6.DEFAULT SETTINGS..... | 10 |
| 7.HAVE ACCESS TO YOUR 4G ROUTER | 12 |
| 7.1 -SIM CARD CONFIGURATION | 12 |
| 7.2-MAKE SURE THAT THE DHCP SERVER IS ENABLED IN YOUR ROUTER | 14 |
| 7.3-CONFIGURE THE WIFI ACCESS POINT | 15 |
| 7.3.1-Router Settings With WDS | 15 |
| 7.3.2-Router Settings Without WDS | 16 |
| 7.4-ENABLE THE MQTT PROTOCOL | 16 |
| 7.5-BEANDEVICE® WILLOW® CONFIGURATION | 16 |
| 7.6-BEANSCAPE® RA CONFIGURATION (REMOTE ACCESS) | 21 |
| 8.WHERE TO FIND MORE TECHNICAL INFORMATION | 23 |

List of Figures

DISCLAIMER

The information contained in this document is the proprietary information of BeanAir[®].

The contents are confidential and any disclosure to persons other than the officers, employees, agents or subcontractors of the owner or licensee of this document, without the prior written consent of BeanAir[®] GmbH, is strictly prohibited.

BeanAir[®] makes every effort to ensure the quality of the information it makes available. Notwithstanding the foregoing, BeanAir[®] does not make any warranty as to the information contained herein, and does not accept any liability for any injury, loss or damage of any kind incurred by use of or reliance upon the information.

BeanAir[®] disclaims any and all responsibility for the application of the devices characterized in this document, and notes that the application of the device must comply with the safety standards of the applicable country, and where applicable, with the relevant wiring rules.

BeanAir[®] reserves the right to make modifications, additions and deletions to this document due to typographical errors, inaccurate information, or improvements to programs and/or equipment at any time and without notice.

Such changes will, nevertheless be incorporated into new editions of this document. Copyright: Transmittal, reproduction, dissemination and/or editing of this document as well as utilization of its contents and communication thereof to others without express authorization are prohibited. Offenders will be held liable for payment of damages. All rights are reserved.

Copyright © BeanAir GmbH 2022

1. TECHNICAL SUPPORT

For general contact, technical support, to report documentation errors and to order manuals, contact BeanAir[®] Technical Support Center (BTSC) at:

tech-support@beanair.com




For detailed information about where you can buy the BeanAir[®] equipment/software or for recommendations on accessories and components visit:

www.beanair.com

To register for product news and announcements or for product questions contact BeanAir's Technical Support Center (BTSC).

Our aim is to make this user manual as helpful as possible. Please keep us informed of your comments and suggestions for improvements. BeanAir[®] appreciates feedback from

2. VISUAL SYMBOLS DEFINITION

| Symbols | Definition |
|---|---|
|  | Caution or Warning – Alerts the user with important information about BeanAir [®] wireless IOT Sensors. if this information is not followed, the equipment /software may fail or malfunction |
|  | Danger – This information MUST be followed if not you may damage the equipment permanently or bodily injury may occur. |
|  | Tip or Information – Provides advice and suggestions that may be useful when installing BeanAir Wireless IOT Sensors. |

3. ACRONYMS AND ABBREVIATIONS

| | |
|----------------|---|
| AES | Advanced Encryption Standard |
| CCA | Clear Channel Assessment |
| CSMA/CA | Carrier Sense Multiple Access/Collision Avoidance |
| GTS | Guaranteed Time-Slot |
| kSps | Kilo samples per second |
| LDCDA | Low duty cycle data acquisition |
| LLC | Logical Link Control |
| LQI | Link quality indicator |
| MAC | Media Access Control |
| PER | Packet error rate |
| POE | Power Over Ethernet |
| RF | Radio Frequency |
| SD | Secure Digital |
| UPS | Uninterruptible power supply |
| USB OTG | USB On The Go |
| WDAQ | Wireless DAQ |
| WSN | Wireless Sensor Networks |

4. QUICK PRODUCT DESCRIPTION

4.1 UNBOX YOUR WILLOW IOT 4G GATEWAY

Wilow IOT Gateway is available in three versions:

- **WILLOW-IOT-GATEWAY-4G-MPWR**, Mains Power supply
- **WILLOW-IOT-GATEWAY-4G-WDS-MPWPR**, Mains power supply, WDS function
- **WILLOW-IOT-GATEWAY-4G-SOLAR**, Solar Power Supply **WILLOW-IOT-GATEWAY-4G-SOLAR**, with Solar Power Supply

The difference between the Mains power version and the solar panel version, is that the WDS function is only available on the Mains power version.

So users who works with the solar power supply version cannot use the WIFI bridge because there is no WDS options which is available.

It is provided with a 4G/LTE antenna, WiFi antenna, external cables for both WiFi & 4G/LTE antennas and a power supply plug

4.2 ACCESSORIES DESCRIPTION

In addition to the WiLow® IoT gateway you will find inside the packet a list of accessories:

- 4G/LTE Antenna
- WiFi Antenna
- External cable for Wifi antenna
- External cable for 4G/LTE antenna
- Power supply plug

4.2 ACCESSORIES DESCRIPTION

Wilow[®] IOT Gateway

WIFI Antenna

Power Supply Plug

4G / LTE Antenna



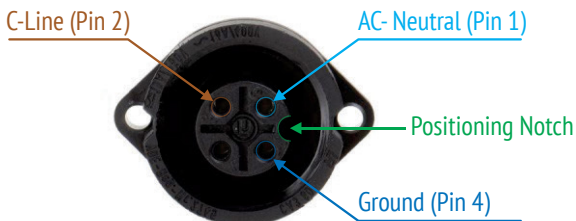
For more info on the accessories and its specification please refer to the user manual

5. INSTALLATION

1 : Please follow the following wiring code instructions to correctly build your own AC Power supply

• MAINS POWER SUPPLY (HARDWARE VERSION BEFORE 15/05/2019)

The previous hardware version comes with a Female Socket and a Male Plug



Wiring Code – Socket Side



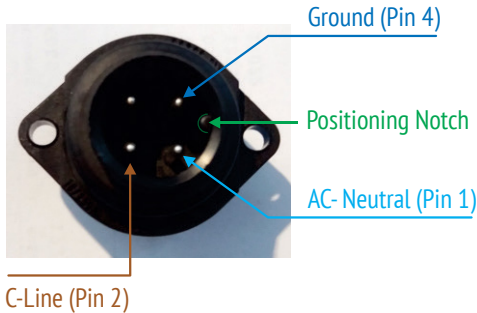
Plug Ref: 934124100, provider: Hirschmann

• MAINS POWER SUPPLY (HARDWARE VERSION AFTER 15/05/2019)

The previous hardware version comes with a Male Socket and a Female Plug

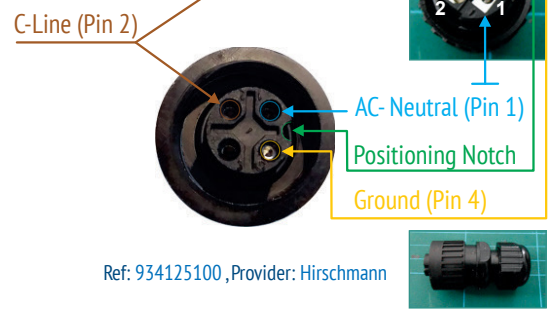
MAINS POWER

Wiring Code – Socket Side



MAINS POWER

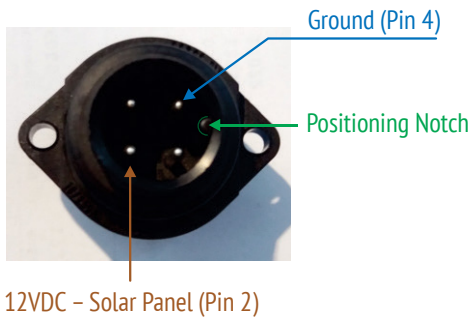
Wiring Code – Plug Side



• SOLAR POWER SUPPLY (HARDWARE VERSION AFTER 15/06/2019)

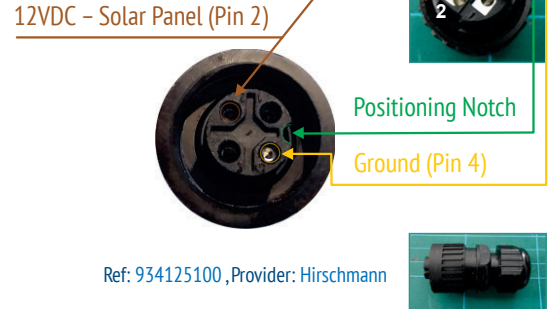
SOLAR POWER

Wiring Code – Socket Side



SOLAR POWER

Wiring Code – Plug Side



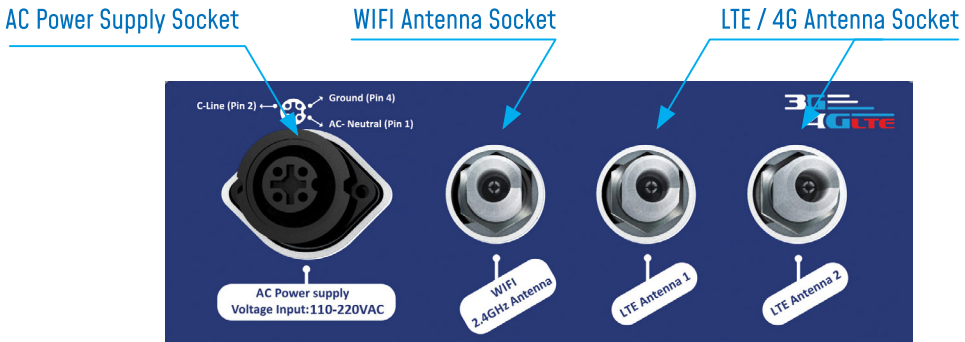
DC Power:

The solar power controller can work between 13VDC to 20VDC, user can use an AC/DC power adapter in this voltage rating.



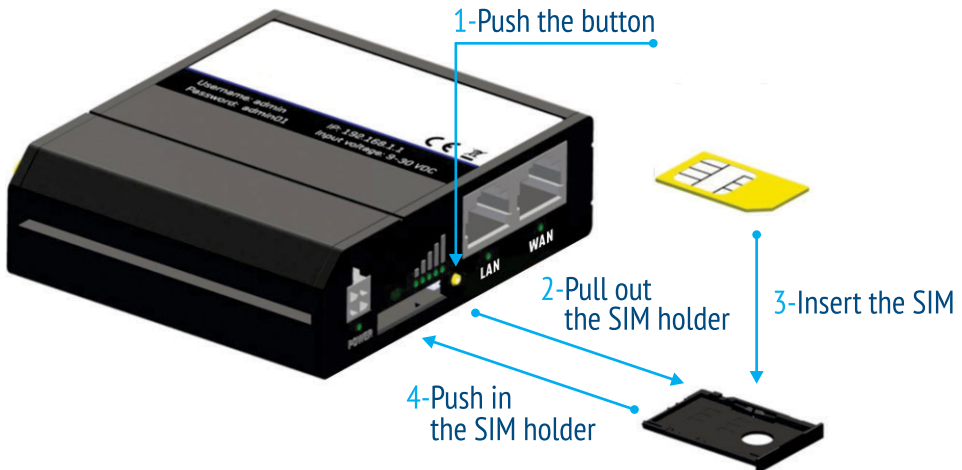
If the DC Voltage is less than 13VDC, the provided voltage will not be enough to power the Solar Power Manager

1. Use the provided antennas cables and power supply cable to connect to the appropriate connectors as shown below in the figure.

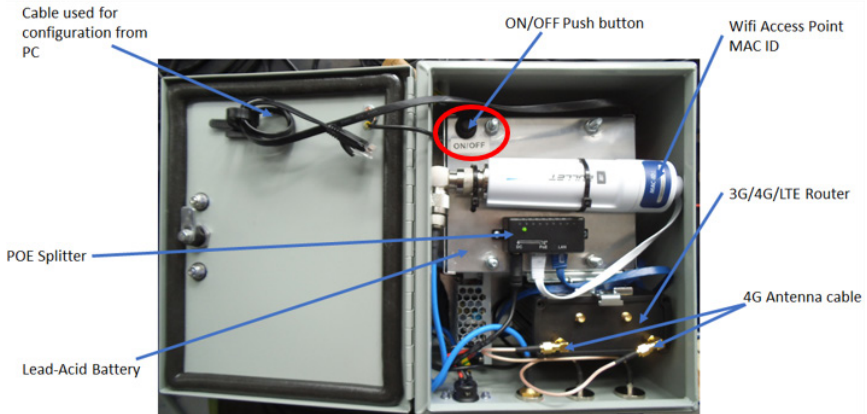


2. Open the box enclosure and use the Ethernet cable to connect your Laptop to the router in order to configure the IoT Gateway and get it ready for remote monitoring, as well to insert SIM card. Use a screwdriver to remove the black lid and properly insert the SIM card.

SIM CARD INSERTION



3. Don't forget to turn On the switch mode box by pushing the ON/OFF push button at the top left corner, in order to charge the Lead-Acid Battery and get the gateway ready for configuration.



4. Use an ethernet cable to connect the router inside the IOT Gateway® to your laptop.



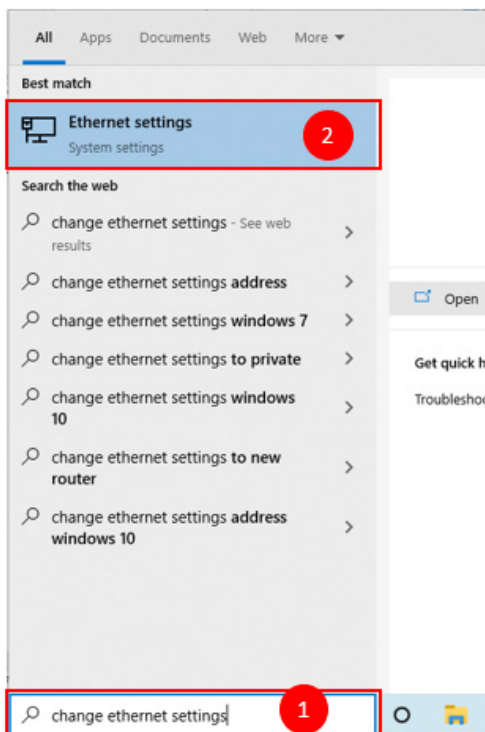
RJ45 Ethernet cable connected to the router which is inside the IOT Gateway



6. DEFAULT SETTINGS

THE IOT GATEWAY® COMES WITH A DEFAULT IP ADDRESS: 192.168.1.243

1. Assign a static IP address to your PC within the same subnetwork as your IOT Gateway®
 - In the search bar tap change ethernet settings, then click on open



- Click on change Adapter settings

Ethernet

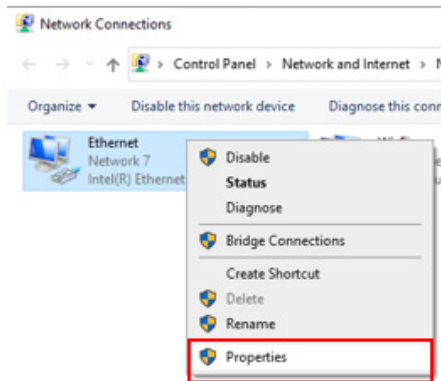
 Network 7
Connected

Related settings

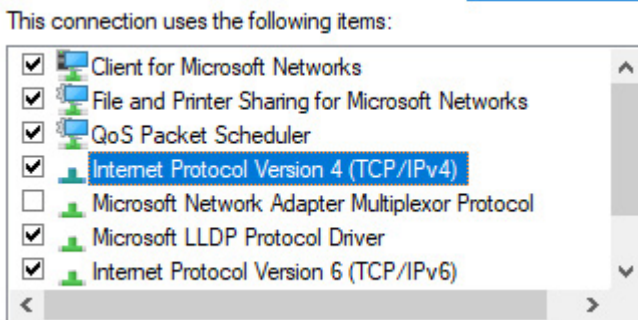
[Change adapter options](#)

[Change advanced sharing options](#)

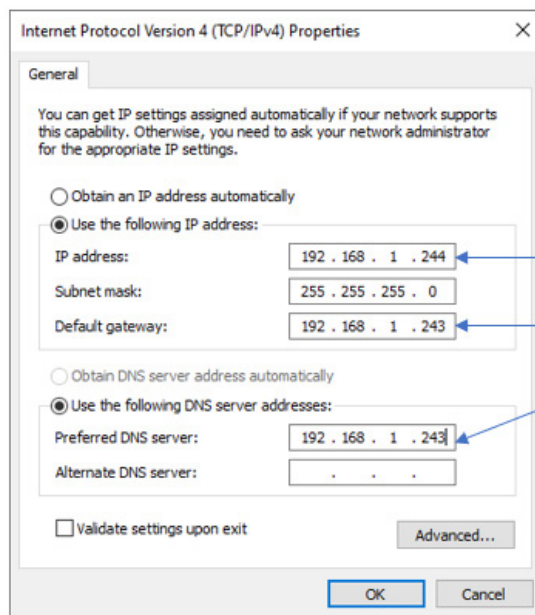
- Right click on the Ethernet device with is connected to your IOT Gateway, choose Propertes



- Double click on Internet Protocol Version4 (TCP/IPv4)



- Enter the flowing settings:
 - Enter any ip in the form of 192.168.1.XXX where XXX is a number from 2 to 254 (except 243 which is the router IP address).
 - Enter 255.255.255.0 for your subnet mask
 - The default gateway must come with the same IP address that your 4G Router has 192.168.1.243
 - Finally enter primary DNS server IP , the same than your 4G Router IP 192.168.1.243
 - Click on OK validate your configuration



- Once your PC and IOT Gaetway® are connected to the same network, you can easily have access to the router.

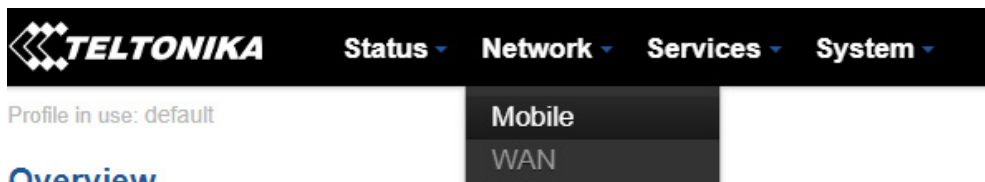
7. HAVE ACCESS TO YOUR 4G ROUTER

Use your browser on your PC and log in to the router using the following settings:

- IP address: [192.168.1.243](#) (tap it in google search bar)
- Username: [admin](#) | password: [Beanair2020!](#)

7.1 SIM CARD CONFIGURATION

- To configure your 4G/LTE Router go on Network then Click on Mobile



- Now configure your mobile settings as follow

General

Network Operators

Mobile Data Limit

Mobile Configuration

Mobile Configuration

SIM 1

Connection type

QMI

Mode

NAT

Passthrough and Bridge modes are disabled when multiwan is enabled

Auto APN

☒

Connection will be established automatically

PIN number

0000

PUK code

Dialing number

*99#

MTU

1500

Service mode

Automatic

Deny data roaming

☐

Choose QMI connection type because PPP is slower than QMI.
QMI option is highly recommended.

Check Auto APN and the connection will be established automatically.
Access Point Name (APN): is a configurable network identifier used by a mobile device when connecting to a GSM carrier

Enter the right PIN number and PUK code of your SIM card

Used this field only if the SIM card's PIN number was used

Choose 1500

Choose Automatic as a service mode

Uncheck Deny data roaming option

Mobile Data On Demand

Enable

☒

No data timeout (sec)

10

Force LTE network

Enable

☒

Reregister

☐

Interval (sec)

300

Save



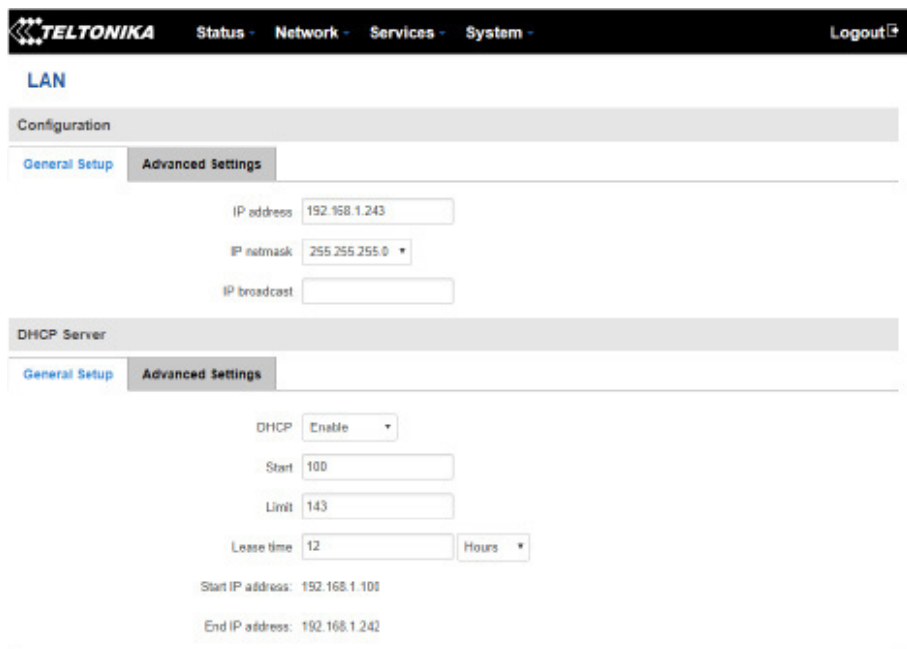
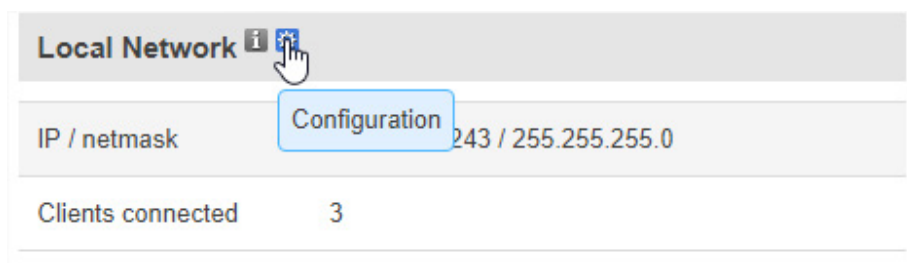
You can get the APN ID from your telecom operator provider



If an invalid PIN number was entered (i.e. the entered PIN does not match the one that was used to protect the SIM card), your SIM card will get blocked. To avoid such mishaps, it is highly recommended to use an unprotected SIM. If it happens and you insert a protected SIM and the PIN number is incorrect, your card won't get blocked immediately, although after a couple of reboots OR configuration saves it will

7.2 MAKE SURE THAT THE DHCP SERVER IS ENABLED IN YOUR ROUTER

- LAN IP address should be 192.168.243 by default and if this is not the case for whatever reason, you will need to set it back to 192.168.1.243 in the configuration panel you can find it in the overview page



7.3 CONFIGURE THE WIFI ACCESS POINT

7.3.1 Router Settings With WDS

- Wilow® IOT Gateway integrates a high gain WIFI Access point. This access point is already preconfigured with the following settings, however the access point settings on the router are disabled, so the WIFI connectivity will be provided by the WIFI Bridge:

| | |
|--------------------|------------------------|
| AP IP address | 192.168.1.20 |
| AP Webserver Login | Ubnt |
| AP Webserver PW | Beanair2020! |
| WIFI SSID | Beanair |
| WIFI Password | Beanair2019 |
| Encryption | WPA2-PSK, Cipher: Auto |
| WIFI RF Channel | Auto |
| AirMax function | disabled |

- If you fail to access to the WIFI Bridge, just reset it to the factory settings. To reset it to factory defaults, press and hold the Reset button for more than 10 seconds while the device is powered on.



- After the reset process the default login information is proved below:
 - Default IP Address (LAN IP): 192.168.1.20
 - Default User Name: **ubnt**
 - Default Password: **ubnt**

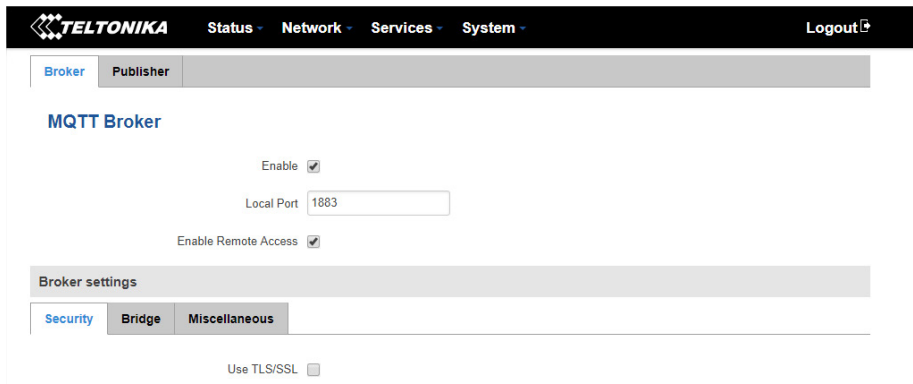
7.3.2 Router Settings Without WDS

- By default the WIFI access point is enabled with the following settings:

| | |
|-----------------|------------------------|
| WIFI SSID | Beanair |
| WIFI Password | Beanair2019 |
| AP Webserver PW | Beanair2020! |
| Encryption | WPA2-PSK, Cipher: Auto |
| WIFI RF Channel | Auto |

7.4 ENABLE THE MQTT PROTOCOL

- Under services tab ,go to MQTT Broker and make sure it is enabled and using Local port 1883 (make sure this port is not used by other application)



TELTONIKA Status Network Services System Logout

Broker Publisher

MQTT Broker

Enable ☒

Local Port

Enable Remote Access ☒

Broker settings

Security Bridge Miscellaneous

Use TLS/SSL ☐

7.5 BEANDEVICE® WILLOW® CONFIGURATION

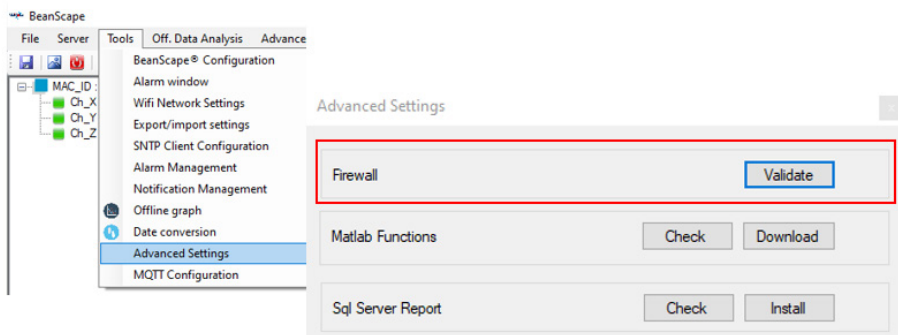
- Connect your Wilow® BeanDevice® to your laptop using the USB cable, turn it on using the magnet, run the BeanScope® supervision software Wilow® then go to (Tools --> WIFI network settings), enter the default network settings and click on validate.



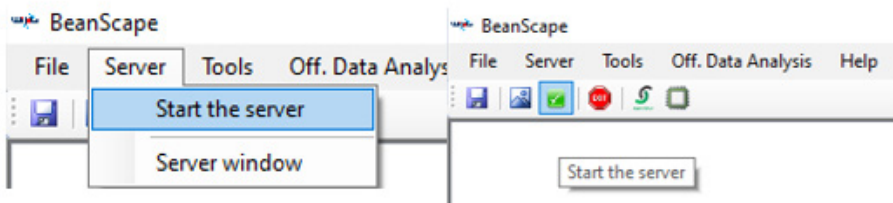
The WIFI AP on the Wilow® IoT Gateway comes with the following WIFI configuration:

- Default SSID: Beanair
- Password: Beanair2019
- security type: WPA2-PSK

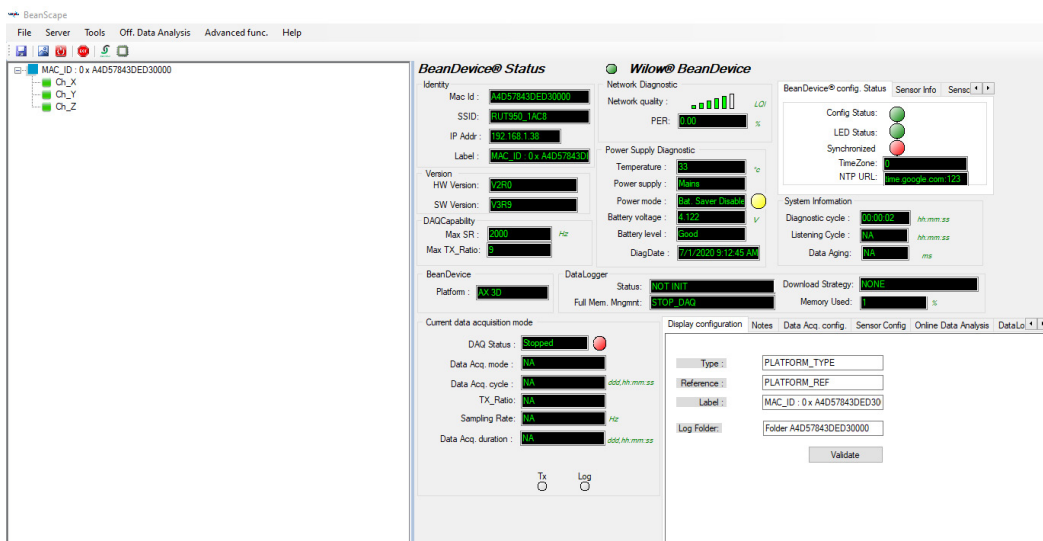
- Add BeanScope to firewall, from tools click on Advanced Settings then Add to Firewall



- Now start the BeanScope® Server by clicking directly on the Green button or selecting Start the server from the Server option on the Menu bar



- The BeanDevice profile will be displayed on your screen



- Next, start MQTT configuration panel on BeanDevice® tab

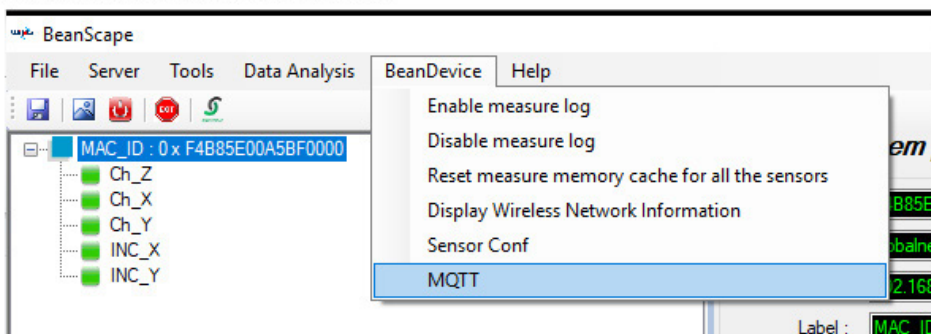
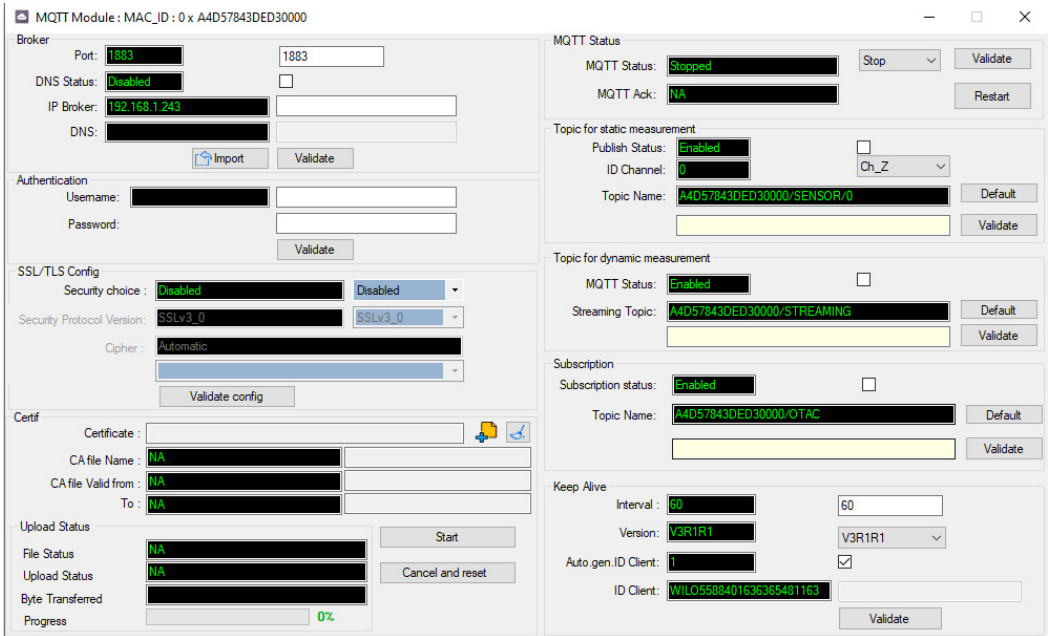


Figure 29 :BeanDevice MQTT module configuration

- MQTT configuration window will pop up:



MQTT Module: MAC_ID: 0 x A4D57843DED30000

Broker
 Port: 1883
 DNS Status: Disabled
 IP Broker: 192.168.1.243
 DNS:
 Import Validate

Authentication
 Username:
 Password:
 Validate

SSL/TLS Config
 Security choice: Disabled
 Security Protocol Version: SSLv3_0
 Cipher: Automatic
 Validate config

Certif
 Certificate:
 CA file Name: NA
 CA file Valid from: NA
 To: NA

Upload Status
 File Status: NA
 Upload Status: NA
 Byte Transferred:
 Progress: 0%

MQTT Status
 MQTT Status: Stopped Stop Validate
 MQTT Ack: NA Restart

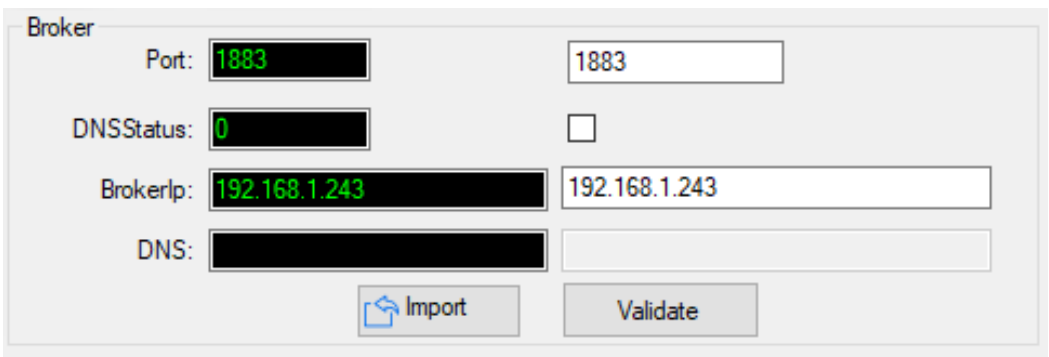
Topic for static measurement
 Publish Status: Enabled
 ID Channel: 0 Ch_Z
 Topic Name: A4D57843DED30000/SENSOR/0 Default Validate

Topic for dynamic measurement
 MQTT Status: Enabled
 Streaming Topic: A4D57843DED30000/STREAMING Default Validate

Subscription
 Subscription status: Enabled
 Topic Name: A4D57843DED30000/OTAC Default Validate

Keep Alive
 Interval: 60 60
 Version: V3R1R1
 Auto gen ID Client: 1
 ID Client: W105588401636365481163 Validate

- Follow these following screenshots and fill in your settings, then validate.



Broker
 Port: 1883 1883
 DNSStatus: 0
 BrokerIp: 192.168.1.243 192.168.1.243
 DNS:
 Import Validate

- Here you can check your MQTT different status, connected, stopped , connecting or disconnecting and can start your connection from here.

MQTTSTATUS

MQTT Status: Connecting

Start

Validate

MQTT Ack: NA

Restart

- LCDC topic is a string used by the broker to filter messages for each LowDutyCycle channel of the connected BeanDevice, enable each channel and set its name to default to avoid problems. Then validate

Topic Ldc Ldca

Publish_status: enabled

☐

Channel ID: 0

Ch_Z

Topic Name: F4B85E00A4D00000/SENSOR/0

Default

Validate

- Streaming topic is a string used by the broker to filter messages for streaming data from the connected BeanDevice. Enable and set its name to default then validate

Streaming topic

Publish_status: enabled

☐

Streaming Topic F4B85E00A4D00000/STREAMING

Default

Validate

This Topic will be the string we will use to connect to the BeanDevice from remote BeanScope supervision software in order to send OTACs. By default this will be set to [MAC_ID/OTAC](#).

- Enable subscribe and set your Topic to default and validate.

Subscription

Subscription status: Enabled ☐

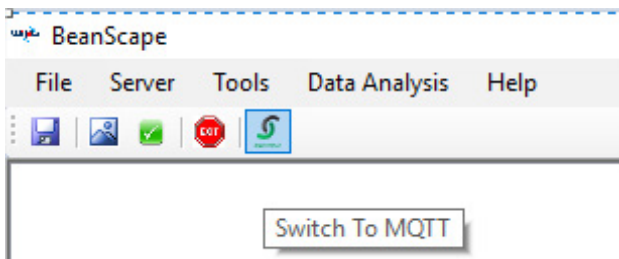
Topic Name: A4D57843DED30000/OTAC Default

Validate

7.6 BEANSCAPE® RA CONFIGURATION (REMOTE ACCESS)

Using BeanScape® RA you will have the ability to subscribe remotely to any BeanDevice® publishing data, first you have to install and run your BeanScape RA at your monitoring office

- You have to switch to MQTT using this button



- Next, go to Tools tab --> MQTT configuration and a new configuration window will pop up, and you will establish a communication with your IoT Gateway,

MQTT Configuration

MQTT Configuration Use DNS ☐

DNS:

Broker IP: 197.8.139.137 197.8.139.137

Port: 1883 1883

☐ Enable Authentication

User Name:

Password:

Validate Clear all

Delete BeanDevice

BeanDevice: Select device

MQTT Connection

MQTT Status: disabled

MQTT Ack: NA

Enable MQTT Start

Add Device

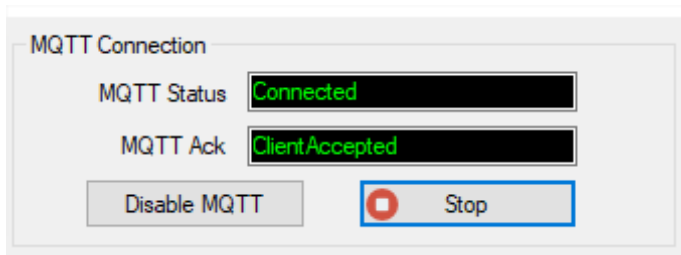
Device Mac ID: Select Device

MAC ID:

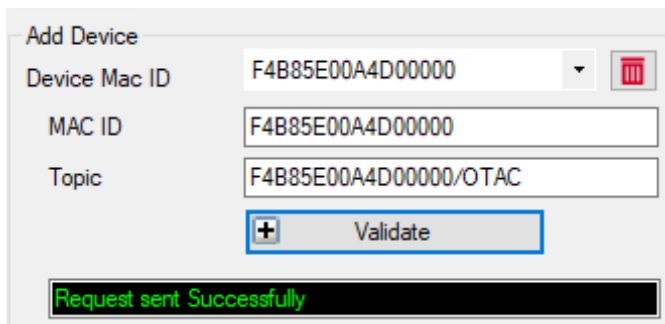
Topic:

Validate

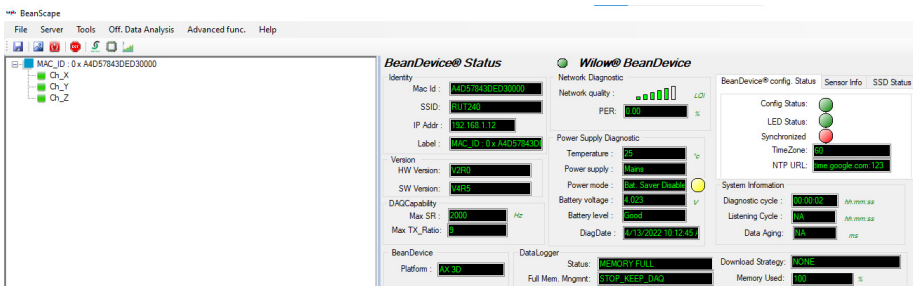
- Port should be set to 1883
- In Broker IP you have to enter the IoT Gateway Public IP Address, then validate
- From MQTT connection, enable MQTT by clicking on start button



- Now, enter the BeanDevice® Wilow® MAC_ID and Subscribe to the same Topic that we had previously setup for the BeanDevice, then validate



- Close the MQTT configuration window and make sure the server is started, the BeanDevice will be at your disposal, to read measurement,



8. WHERE TO FIND MORE TECHNICAL INFORMATION ?

- For more technical literature, please visit our White Paper Page:
- Please refer to the BeanDevice[®] 2.4GHz EcoSensors user manual section for more information
<https://www.wireless-iot.beanair.com/files/UM-RF-03-ENG-EcoSensor-Wireless-Sensors-for-En->
- For detailed information on the available Data Acquisition mode ,please refer to our technical note
<http://www.wireless-iot.beanair.com/files/TN-RF-008-Data-acquisition-modes-available-on-the-BeanDevice.pdf>

Facing technical problems ?
Contact our technical support team at :
tech-support@beanair.com





BeanAir Germany
Wolfener Straße 32-34
12681 Berlin - Germany



Visit us:
www.beanair.com



Email:
info@beanair.com



Office line:
+49 (0) 30 98366680